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(71) Applicant(s)
Safeway Stores Plc
(Incorporated in the United Kingdom)
P O Box 8, 6 Millington Road, HAYES, Middlesex, UB3 4AY, United Kingdom

(72) Inventor(s)
David John Humphreys
Kevin Christopher Spencer

(74) Agent and/or Address for Service
W P Thompson & Co
Coopers Building, Church Street, LIVERPOOL, L1 3AB, United Kingdom

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(54) Abstract Title
Preservation of nuts or seeds

(57) The shelf life of food products comprising nuts and/or seeds is prolonged by storing the products in an argon-rich environment obtained by introducing an argon-rich gas into a substantially gas-impermeable container such as a metallised plastic film bag containing the food products during packaging. The argon-rich atmosphere may be substantially 100% argon or may comprise other gases in addition eg carbon dioxide or nitrogen. Use of an argon-rich environment prolongs the shelf life of such foods products and reduces the deterioration in taste quality.

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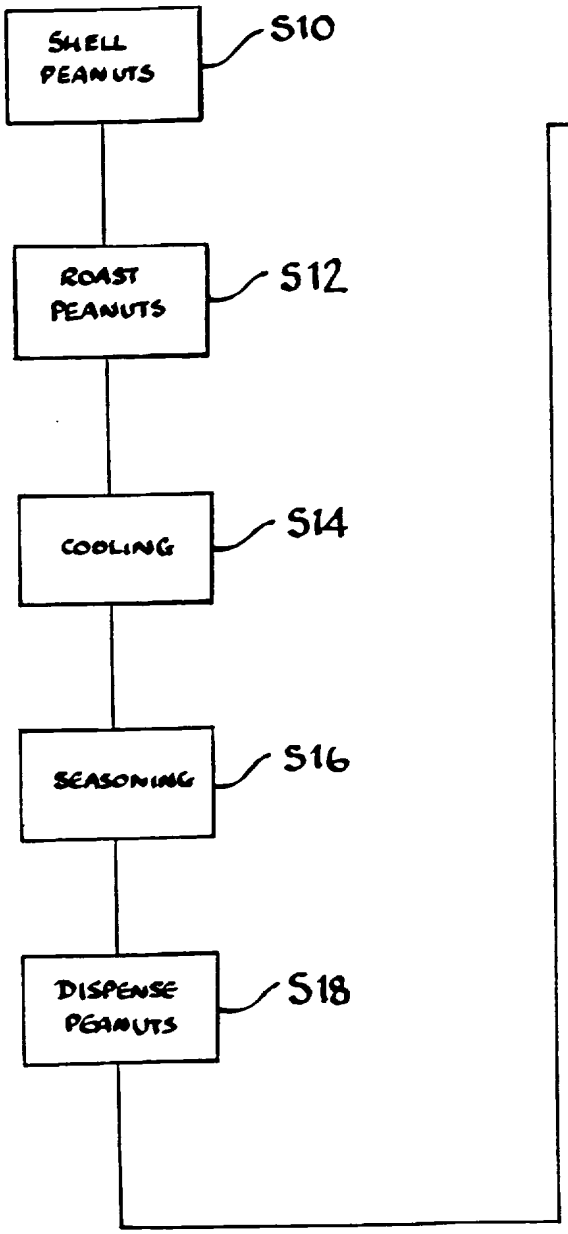
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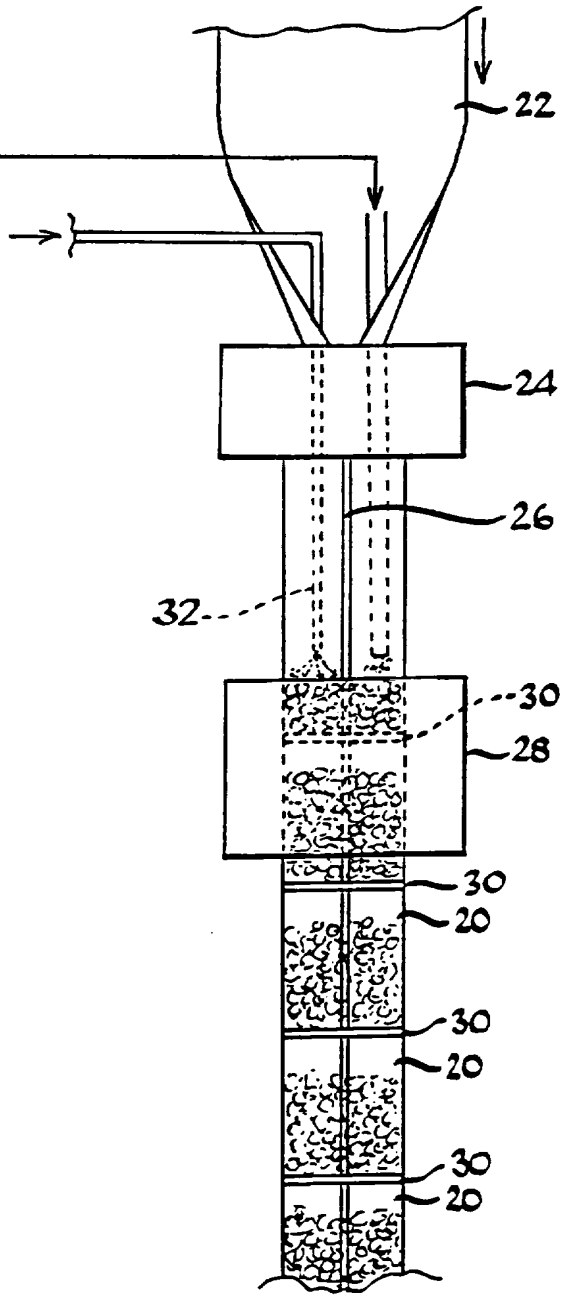
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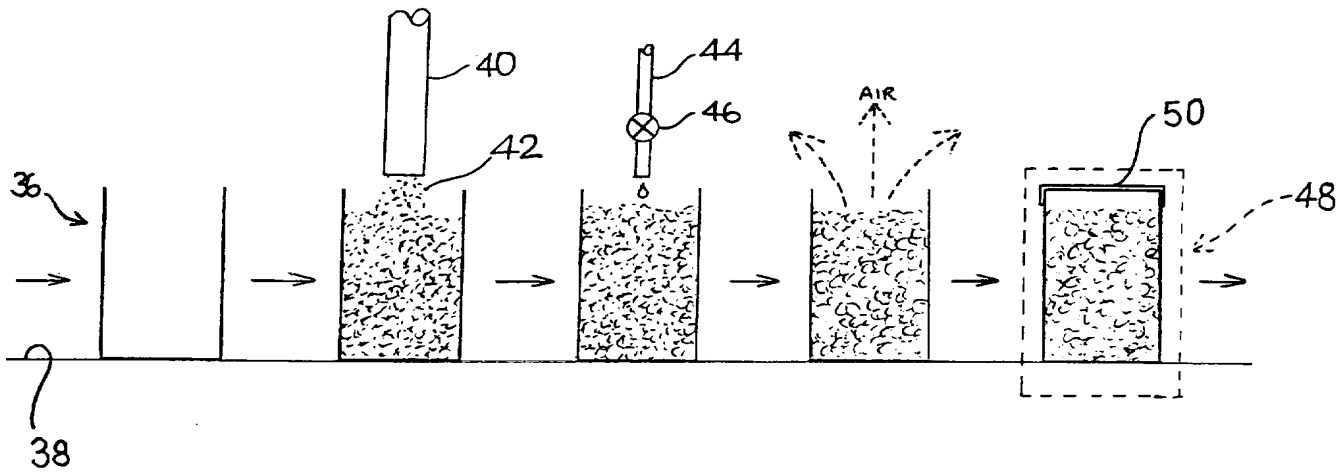

Fig. 2

DESCRIPTION

PRESERVATION OF NUTS AND SEEDS

The present invention relates to the preservation of nuts, seeds and products containing nuts and/or seeds and in particular, but not exclusively, to edible nuts, seeds and products containing edible nuts and/or seeds.

It is an object of the present invention to prolong the storage life of such products and additionally to prevent deterioration of the taste and texture of the products during storage.

In the preparation of nuts and seeds, the raw ingredients are prepared (and mixed where appropriate), processed (normally by cooking, particularly by roasting where applicable), cooled and seasoned where appropriate. Portions of predetermined weight of the product are then packed into receptacles which are typically in the form of plastic bags or plastic or metal cans or drums conveyed along a filling line which are then sealed.

Whilst such methods of packaging are effective in preventing the ingress of moisture into or the egress of moisture from the container after packaging, there is inevitably a volume of air which remains in contact with the product during storage. The presence of such air, and in particular the oxygen content, contributes to the deterioration of the quality and taste of the product

during storage.

In an attempt to increase the shelf life of such products it is known to displace the air in the container during packaging with a charge of nitrogen. In such methods the incoming nitrogen is injected at a relatively high velocity which causes the majority of the air (and therefore the majority of the oxygen) to be displaced from the package. If the package is sealed very shortly thereafter the product is thereafter stored in a nitrogen-rich and oxygen-depleted environment, thereby increasing the shelf life of the product.

However, whilst the use of nitrogen improves the shelf life of the product, the taste quality of the product still deteriorates more than is desirable during such an extended shelf life.

In accordance with a first aspect of the present invention, a method of prolonging the shelf life of nuts, seeds and products containing nuts and/or seeds comprises storing the nuts, seeds or products in an argon-rich environment in a substantially gas-impermeable container.

The use of an argon-rich atmosphere in contact with the product is found both to prolong the shelf life of the product and, just as importantly, greatly reduce the deterioration in taste quality. Indeed, taste tests have consistently resulted in very high scores for nuts and seeds stored in accordance with the present invention.

The use of an atmosphere of substantially 100% argon

has been found to be particularly effective in the prolongation of shelf life and taste quality of nuts, seeds and products containing nuts and/or seeds.

Moreover, since argon is denser than air the air formerly in the container is more efficiently displaced during packaging, thus resulting in lower residual oxygen levels as compared with the prior art, but with a similar amount of gas (or even less) to that used in the prior art.

The argon-rich atmosphere may also comprise one or more other gases including, but not limited to, other noble gases, carbon dioxide and nitrogen.

Reference to a "substantially gas impermeable" container means a container which is effective in maintaining the gas mixture within the container substantially constant during storage of the product. A typical example of such a container would be a metallised plastic film bag.

In accordance with a second aspect of the present invention, a process for packaging food products comprising nuts and seeds comprises packing the food product in a substantially gas-impermeable container, introducing an argon-rich gas into the container and sealing the container to retain the argon-rich gas within the container.

By way of example only, specific embodiments of the present invention will now be described with reference to

the accompanying drawings, in which:-

Fig. 1 is a schematic flow diagram of a first process for packaging nuts, in accordance with the present invention; and

Fig. 2 is a schematic flow diagram of a second process for packaging nuts, in accordance with the present invention.

The processes described are for preparing roasted peanuts (ground nuts) but are equally applicable to other nuts (whether in or out of their shells), seeds, grains and the like, and products containing nuts, seeds or grains.

Referring firstly to Fig. 1, at step 10 (hereinafter "step" will be replaced by "S") the peanuts are shelled and at S12 they are roasted at the appropriate temperature and for the appropriate time. After being roasted, the nuts are cooled at S14 (either in the normal atmosphere or by means of a cooling arrangement) and at S16 seasoning (such as salt and/or other flavours) is added to the cooled nuts.

At S18 predetermined portions (by weight) of the cooled, seasoned nuts are dispensed into a series of containers in the form of plastic bags 20 which are open at one end.

As illustrated schematically, the bags 20 are formed in a conventional manner from a web 22 of bag material which is formed into a continuous tube by means of a web

welding unit 24 which secures together the opposite longitudinal edges of the web (e.g. by means of heat or radio frequency welding) to form a continuous longitudinal seam 26. The tube is sequentially formed into individual bag units 20, after having been filled, by means of a bag sealing unit 28, which forms transverse seals 30 which form the top of a filled bag and the base of the bag to be filled next.

As for the conventional use of nitrogen, just prior to and/or during filling of the plastic bags 20 with the nuts, a so-called "lance" 32 is positioned via the open end of the bag to be filled such that its end lies within the walls of the bag to be filled. A charge of argon-rich gas (for example 100% argon) is then injected into the bag prior to and/or during and/or after the nuts have been dispensed into the bag. As they are filled, the bags pass sequentially into the sealing apparatus 28 which seals the open end of the bag. The filled, sealed bags are then taken away to be separated into individual bags and for further packing.

The apparatus required for this embodiment is conventional and need not be described further hereinafter since it will be well known to those skilled in the art.

A second process in accordance with the present invention is illustrated schematically in Fig. 2. In this process, the preparation of the nuts is identical to

that described previously in steps S10-S18 of the first embodiment and are therefore not repeated here. The difference lies in the filling of the containers, as will be explained.

In contrast to the first embodiment, in which the nuts are dispensed into plastic bags, in the second embodiment the nuts are dispensed into substantially rigid containers such as cans or drums 36 (typically made from plastic or metal) which are transported by a conveyor 38. The conveyor is preferably advanced stepwise and as each can or drum is located beneath a discharge chute 40, a predetermined charge of nuts 42 is dispensed into the can or drum. The conveyor is then advanced to the next position to allow the following can to receive a charge of nuts and at the next position the can or drum 36 which received a charge of nuts at the preceding step is located directly beneath a conventional liquid droplet dispenser 44 which is supplied with a gas identical to that used in the first embodiment (in this case 100% argon), but in liquefied form.

The outlet liquid droplet dispenser is controlled by a solenoid actuated valve 46 which is arranged to dispense one or more drops of liquefied gas into the can or drum 36. The liquefied gas begins to vaporise immediately after having been dispensed and continues to vaporise within the can or drum 36. Thus, as gaseous argon fills the can or drum the air formerly in the can

or drum is displaced out of the container. The displacement of the air within the can or drum is aided by the fact that argon is denser than air and thus tends to sink to the base of the can or drum. This normally allows less gas to be used as compared with the prior art.

The can or drum 36 is then advanced to a closure-applying station 48 (illustrated very schematically in Fig. 2) where a closure 50 (again illustrated very schematically) is applied to the open end of the can or drum 36, sealing the nuts within an argon-rich atmosphere until the can or drum is opened.

As indicated previously, the atmosphere in contact with the nuts in the bag 20 or can or drum 36 need not be 100% argon. For example, other gases instead of, or in addition to argon (such as other noble gases, nitrogen and carbon dioxide) may be injected via the lance 22 or dispensed via the dispenser 42. Moreover, the lance 22 or the dispenser 42 may be arranged to displace only a proportion of the air within the bag rather than to replace the contents entirely with the gas flowing through the lance 22 or the gas formed from the liquid droplets dispensed from the dispenser 42.

Although the specific embodiments have been described with reference to peanuts (ground nuts), it will be appreciated that it is equally applicable to other nuts (whether in or out of their shells), and to

seeds, grains and products containing nuts, seeds or grains as described previously and that only the preparation of the product will differ. The filling of the packets with the product will be substantially identical to that described for peanuts.

The invention is not restricted to the details of the foregoing embodiments. For example, the embodiment of Fig. 1 could be modified to incorporate the liquid droplet dispenser 44 of the second embodiment and the embodiment of Fig. 2 could be modified to incorporate the lance 32 of the first embodiment.

CLAIMS

1. A method of prolonging the shelf life of nuts and seeds, or food products comprising nuts and/or seeds, comprising storing the food product in an argon-rich environment in a substantially gas-impermeable container.

2. A method as claimed in claim 1, wherein the argon-rich environment is substantially 100% argon.

3. A method as claimed in claim 1, wherein the argon-rich atmosphere further comprises one or more other gases.

4. A method as claimed in claim 3, wherein the one or more other gases is/are selected from the group comprising other noble gases, carbon dioxide and nitrogen.

5. A method as claimed in any of the preceding claims, wherein the substantially gas-impermeable container comprises a plastic film bag.

6. A method as claimed in claim 5, wherein the plastic bag comprises a metallised plastic film bag.

7. A method as claimed in any of claims 1 to 5, wherein the substantially gas-impermeable container is substantially rigid.

8. A method as claimed in claim 7, wherein the container comprises a can or drum.

9. A process for packaging food products comprising nuts and/or seeds, comprising packing the food product in a substantially gas-impermeable container, introducing an

argon-rich gas into the container and sealing the container to retain the argon-rich gas within the container.

10. A process as claimed in claim 7, wherein the argon-rich gas is dispensed into the container as a gas.

11. A process as claimed in claim 7, wherein the argon-rich gas is dispensed in liquid form.

12. A process as claimed in any of claims 9 to 11, wherein the gas comprises substantially 100% argon.

13. A process as claimed in any of claims 9 to 11, wherein the argon-rich gas further comprises one or more other gases.

14. A process as claimed in claim 13, wherein the one or more other gases is/are selected from the group comprising other noble gases, carbon dioxide and nitrogen.

15. A process as claimed in any of claims 9 to 14, wherein the argon-rich gas displaces substantially all of the air previously within the container.

16. A process as claimed in any of claims 9 to 14, wherein the argon-rich gas displaces a proportion of the air formerly within the container.

17. A process as claimed in any of claims 9 to 16, wherein the substantially gas-impermeable container comprises a plastic film bag.

18. A process as claimed in claim 17, wherein the plastic bag comprises a metallised plastic film bag.

19. A method of prolonging the shelf life of food products comprising nuts and/or seeds, substantially as herein described, with reference to, and as illustrated in the accompanying drawing.

20. A process for packaging food products comprising nuts and/or seeds substantially as herein described, with reference to, and as illustrated in, the accompanying drawing.

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Application No: GB 9823587.2
Claims searched: 1 to 20

Examiner: Steve Wintersgill
Date of search: 5 February 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): B8C (CF11, CF12, CWP3)

Int Cl (Ed.6): A23B 4/14, 4/16, 7/152; A23L 3/3445; B65B 31/00, 31/02; B65D 81/20

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	WO 93/17652 A1	(L'AIR LIQUIDE) see page 13 line 1 to page 14 line 2.	3, 4, 11, 13 and 14.
X,Y	US 3,498,798	(BAUR) see column 5 lines 71 to 74.	X: 1, 2, 5 to 10, 12 and 15 to 18. Y: 3, 4, 11, 13 and 14.

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.